ON-SITE INSPECTION FOR ARMS CONTROL

RICHARD L. SHEARER, JR.

the national defense university

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ON-SITE INSPECTION FOR ARMS CONTROL

Breaking the Verification Barrier

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Breaking the Verification Barrier

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FOREWORD

The United States and the Soviet Union have engaged in arms control negotiations for decades. But the talks have produced only a few agreements, the arms race has continued, and the outlook is discouraging. Why so little progress? Among the unsettled issues hindering the arms control agreements, the problem of verification—which limits both the scope and effectiveness of agreements—has been one of the most contentious.

In this monograph, Colonel Richard L. Shearer, Jr., US Air Force, examines the role and methods of verification in arms control negotiations. He finds that current verification means are inadequate; instead, he recommends a renewed effort at on-site inspection as a method that might encourage progress. Colonel Shearer suggests ways in which the United States could benefit by allowing Soviet inspectors on American soil without requiring the Soviet Union, historically opposed to such intrusions, to reciprocate.

Many observers consider that the United States should now take the lead in advancing stalled arms control negotiations. The National Defense University is pleased to offer this rethinking of the idea of on-site inspection to all concerned with improving arms control and US national security.

Richard D. Lawrence
Lieutenant General, US Army
President, National Defense
University

ABOUT THE AUTHOR

Colonel Richard L. Shearer, Jr., US Air Force, wrote this monograph while assigned as a senior fellow in the Research Directorate of the National Defense University. Colonel Shearer has earned a bachelor of science degree in mathematics at the University of Maryland; a master of science degree in systems analysis at West Coast University; master of science degrees in management and in operations research and statistics from Rensselaer Polytechnic Institute; and a Ph.D. in management, also from Rensselaer Polytechnic Institute. Colonel Shearer's past assignments include the Space and Missile Systems Organization in Los Angeles, California, and the Office of External Affairs, Headquarters US Air Force Studies and Analyses, at the Pentagon. He is currently assigned at Wright-Patterson Air Force Base, Ohio.

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THE PROBLEM OF VERIFICATION

Unverifiable agreements only increase uncertainty, tensions, and risks. The critical obstacle in virtually every area of arms control in the 1970s was Soviet unwillingness to accept verification measures needed for more ambitious limitations.

Alexander M. Haig, Jr.
US Secretary of State
14 July 1981

THE PROBLEM OF VERIFICATION

On 26 May 1972, the United States and the Soviet Union signed the first Strategic Arms Limitation Talks agreement, SALT I. In the United States, it signaled the beginning of an era of cooperation with the Soviet Union and generated high expectations for arms control. But today the promise of arms control remains largely unfulfilled. There is a variety of reasons for this failure. A major contributing factor is the inability of the United States and the Soviet Union to develop the mutually acceptable verification procedures needed to safeguard more substantial arms control measures. A review of developments to date clearly shows that the verification procedures agreed to by both sides have constrained arms control progress and have had unintended force development implications. Furthermore, they have led to the neglect of on-site inspection as a tool to help assure treaty compliance.

VERIFICATION: SAVIOR OR CULPRIT?

Over 14 years ago, the United States and the Soviet Union sat down to negotiate mutual limits on strategic weapons. Legitimate optimism was based on several factors:

- Both recognized and sought to avoid the horrors of war.
- Rough parity existed.

Keywords: Balance of power/deterrence; Strategic weapons/treaties; Arms control/verification; Nuclear proliferation/negotiations. (MM)

- Both possessed enough weapons for deterrence—enough to absorb a first strike and still inflict unacceptable damage on the other in retaliation.
- Opposing forces were stable because neither side could decisively alter the strategic balance in its favor by striking first.

Even though SALT I entered into force in October 1972, and SALT II was negotiated and signed in June 1979 (although never ratified), the strategic arms race has continued virtually unabated.

The United States began deploying multiple independently targetable reentry vehicles (MIRVs) on ballistic missiles in June 1970. The Soviet Union followed suit with a massive buildup expected to continue throughout the 1980s. The United States is responding with a modernization of its forces—the MX, Trident, Pershing II, and cruise missiles; the B–1B and Advanced Technology Bombers. The US buildup will continue into the 1990s. Furthermore, with the advent of accurate missiles and high-value (multiple-target) weapons, the United States and the Soviet Union have jointly moved toward unstable force deployments. Increasingly, both sides appear to believe that it is more advantageous to strike first and correspondingly more self-defeating to ride out an attack. All this is being done without violating the launcher limits or modernization constraints of SALT I or SALT II.

What went wrong? Nobody argues with the traditional arms control objectives of reducing the risk of war, reducing damage should war occur, and reducing military costs.[1] Why then have the United States and the Soviet Union made so little progress when progress is so much in their mutual interest?

Many valid and interrelated reasons come to mind:

- The arms race evolves in an "action-reaction" pattern, with each side misunderstanding and overreacting to the other's actions. The less one side knows of the other's capabilities, plans, and intentions, the more it tends to react to possibility rather than reality—and

tends to arm for more than the real threat. The other side, in turn, sees a buildup that it believes to be excessive. Feeling threatened, it reacts with its own buildup—and the spiral continues.

- Both sides rely on worst-case analyses. Since neither side knows the other's intentions, each bases plans on its estimate of the other's capabilities. Since the horrors and consequences of nuclear war demand every margin of safety, each side seeks satisfactory outcomes (or guaranteed deterrence) even when the conditions of war are dictated by the other side.[2] But satisfactory outcomes in the worst of circumstances require better forces than are needed for equal outcomes in equal circumstances. Preparing for the worst means having something more than parity. Both sides preparing for the worst can only fuel the arms race.

- Neither side is willing to accept the parity that a true commitment to arms control would entail. Further, they find it difficult to agree on a definition of parity in which forces are not symmetrical. The Soviets have often been accused of seeking arms control agreements only to discourage US actions, with no intent to slow their own military buildup.[3] On the US side, popular support for arms control has raised pressure for agreements—especially before elections—but support for arms control in the government has fluctuated widely. In fact, the Reagan administration was broadly perceived, at least initially, as being uninterested in arms control and committed to reestablishing a margin of US military superiority.

- Organizational interests and bureaucratic inertia afflict both parties. While cooperation between the US Defense Department and industry is necessary and beneficial, unsatisfied military needs and corporate desire for profit foster mutual support for individual programs without due regard for larger US interests. On the Soviet side, there are many organizations dedicated to weapon

development whose very survival could be called into question by appropriate arms limitations.

- Cultural, technological, and other differences make problems too hard to solve. The Soviet obsession with secrecy is an obvious problem with respect to verification. On the other hand, US moves to take advantage of technological progress—MIRVs or cruise missiles, for example—have also hampered arms control progress.

Still other reasons can be found, but the underlying truth is that nations have historically relied on arms to insure their security, and they do not willingly lay down or reduce their arms when facing an adversary they fear and distrust. So arms control agreements require that each side be reasonably confident that the other is complying with agreed upon conditions.

To verify compliance with US-Soviet agreements, the Soviets can monitor US activity from open sources—congressional hearings and reports, the media, professional journals such as *Aviation Week,* Department of Defense annual reports and posture statements, and public speeches. The Soviets may be concerned that the United States will withdraw from or abrogate a treaty—witness discussions in the United States on protecting intercontinental ballistic missiles (ICBMs) by deploying missiles now banned by the Antiballistic Missile (ABM) Treaty. Nevertheless, the Soviets should realize how nearly impossible it would be for the United States to covertly plan, develop, and deploy military systems or forces that violate a US treaty. Covertly developing and deploying any system would be very hard for the United States to manage. If that system also violated a US treaty, the prospects for program approval and funding, for all practical purposes, would be nil. So it is entirely understandable that the Soviets have not supported inclusion of strong, reciprocal verification measures in arms control agreements.

The United States, on the other hand, in seeking to assure treaty compliance, faces a closed Soviet society where information is tightly controlled. Furthermore, monitored data on Soviet forces must be publicly releasable and convincing

since the American public in general and the Senate in particular must also be assured of Soviet compliance. In a climate of suspicion and skepticism caused by the Soviet invasion of Afghanistan, the apparent anthrax deaths at Sverdlovsk, and "yellow rain" in Laos, Kampuchea, and Afghanistan, the United States will reject anything less than full and effective verification of treaty compliance.

The United States has been steadfast in calling for adequate verification provisions as a condition of arms control agreements. In 1969, for example, President Nixon told the SALT I negotiators that agreed upon measures must be subject to adequate verification. The Arms Control and Disarmament Act Amendment of 1977 reads, "It is the sense of Congress that adequate verification of compliance should be an indispensable part of any international arms-control agreement." President Reagan reaffirmed the requirement on 29 June 1982 in a letter to Ambassador Edward Rowny, the US Special Representative to Arms Control and Disarmament Negotiations: "The American people will not accept an agreement unless it is equal and verifiable, and contributes to stability."

Strategic arms control agreements to date have generally met the test of adequate verification, but not because treaties included provisions to improve verification. They met the test only because agreements were limited to provisions that were inconsequential or could be reasonably verified by national technical means (NTM).[4] For example, there is no comprehensive test ban treaty largely because NTM can't distinguish low-yield underground explosions from earthquakes. Agreements do not limit missile and weapon production. Launchers are controlled, but keeping old missiles is permitted. Missile launchers can be reloaded and used to fire two or more missiles—a loophole the Soviets can use to advantage since many of their ICBMs are "cold-launched."[5]

The role of verification in strategic arms limitation is well documented. Many examples illustrate how verification capabilities have shaped arms control agreements and even influ-

enced force structure decisions. In the 1960s, the United States maintained that verification required on-site inspection. However, the Soviets did not accept on-site inspection of their strategic weapons, so negotiations progressed slowly. The breakthrough came with the advent of satellites that could monitor launchers and aircraft, and at times the weapons themselves. Thus, SALT I, with provisions for verification by NTM, was signed and ratified in 1972 only after the United States dropped its requirement for on-site inspection.

By the time SALT II was signed on 18 June 1979, both sides had deployed MIRVs. Therefore, to reach agreement, the negotiators needed to devise rules for counting warheads to cap the number of warheads per missile. Both sides agreed not to flight-test or deploy intercontinental or sea-launched ballistic missiles (SLBMs) with more warheads than had been flight-tested as of 1 May 1979.[6] The agreement still limited the number of launchers, rather than missiles, but the counting rules in effect restricted the number of warheads deployed in those launchers.[7] For example, the Soviet SS–18 missile is legally limited to carrying 10 warheads—the maximum it has been tested with—although it is capable of carrying many more.

Although the US Senate has not ratified SALT II, President Reagan has initiated START (Strategic Arms Reduction Talks) and proposed that ballistic missile warheads be reduced to 5,000, with no more than 2,500 on ICBMs—presumably using the counting rules from SALT II to determine the maximum number of warheads permitted, since counting procedures were not specified.[8]

The apparent progress on verification since the late 1960s ignores the effect that verification rules have had on weapon systems. Controlling launchers or missiles instead of warheads has encouraged "MIRVed" systems, because they increase power within agreed upon constraints. The US deployment of Minuteman III with 3 warheads and Poseidon with 2 or 10 did not violate SALT I even though these missiles increased US destructive capability tremendously.[9] The MX

missile with 10 warheads is designed for maximum capability within SALT II constraints. The Soviets have also deployed a variety of MIRVed ICBM and SLBM systems, following the same legalistic formulas.

Unfortunately and ironically, the MIRVed systems that these "legal" force multiplying efforts create are valuable targets themselves. One warhead hitting a MIRVed missile can destroy several enemy warheads—this fact encourages first strikes and, with the advent of accurate delivery systems, undermines the stability that existed before SALT I. If an equal and verifiable limit had been negotiated on warheads instead of launchers, the incentive to deploy MIRVs would have been reduced. Deploying non-MIRVed systems, on the other hand, would increase both the utility[10] and survivability[11] of the set number of warheads, perhaps offsetting the economic advantages of MIRVing. Certainly, if the United States had foreseen the problems of Minuteman vulnerability and the difficulties of finding a survivable basing mode for MX, it would have been strongly motivated, under a warhead limit, to deploy only stable, non-MIRVed ICBMs.

Current rules also discourage the stabilizing move of replacing MIRVed missiles with single warhead missiles in existing launchers. Because launchers are controlled rather than missiles, such "de-MIRVing" would leave the count unchanged. Why deploy fewer warheads than allowed if the count won't change? Thus, verification rules encourage maximum MIRVing within negotiated limits, undermining the potential utility and survivability of weapons systems and hastening movement toward unstable systems.

Verification procedures that allow accurate warhead counts regardless of launchers would remove many of the incentives to deploy highly MIRVed, destabilizing systems and negate the need for artificial counting rules that have undesirable or unintended consequences. Moreover, movement toward more qualitative arms control measures and strategic systems without large, obvious launchers also underlies the need for improved verification methods. National technical

means alone will not be able to meet future verification requirements.

A NEGLECTED SOLUTION: ON-SITE INSPECTION

As noted earlier, the United States maintained that verification required on-site inspection until the advent of photo-reconnaissance satellites. The satellites could observe aircraft, silos, or submarines needed to deliver nuclear warheads. These observable delivery means, in effect, served as surrogates for the warheads, giving the United States an alternative way to verify compliance and opening the door to SALT I, SALT II, and progress in arms control. But weapons are now being developed that don't depend on anything NTM can observe—hampering continued progress and even undermining the basis of current agreements. Surrogates have been useful, but their days are numbered. The time has come to reexamine on-site inspection—its prospects, its benefits, and its problems—without being put off by the usual arguments, "It's too hard to implement" or "The Soviets won't accept it."

This paper begins that reexamination and recommends a strategy to promote increased on-site inspection. The United States would benefit from the recommended strategy even if the Soviets remained opposed to it.

Chapter 2 discusses verification, developing and justifying the need for improvement as a prerequisite to arms control progress and pointing out where on-site inspection could help. Chapter 3 addresses on-site inspection in more depth, suggesting unique benefits, offering alternative inspection techniques and assessing the prospects for implementation. Chapter 4 proposes a US strategy to promote on-site inspection.

Verification will remain central to arms control, and on-site inspection should become a key ingredient in that process. The quest for stability and peace requires an effective

verification program. On-site inspection can break down the barriers that have so far made verification a major limiting factor in arms control agreements.

The two superpowers have been negotiating seriously since 1969. Progress, although slow and at times grudging, has been made. The United States should expect more cooperation on verification in the future as both sides build on past agreements. If the Soviets do not cooperate, the United States should recognize that it cannot depend on arms control for national security. Instead, the United States should then proceed with additional programs to meet Soviet challenges—programs above and beyond those needed for an integrated arms control-defense approach to security.

2
WHY IMPROVE VERIFICATION?

We insist on an equal balance of forces. And, given the overwhelming evidence of Soviet violations of international treaties concerning chemical and biological weapons, we also insist that any agreement we sign can and will be verifiable.

President Ronald Reagan
State of the Union Address
25 January 1983

WHY IMPROVE VERIFICATION?

Historically, the United States and the Soviet Union have discussed procedures for better monitoring of each other's strategic forces only as part of arms control agreements. In a sense, this has actually complicated negotiations. Improved monitoring provisions would help build confidence between nations, even if developed and negotiated separately from arms control agreements, because they would relieve many of the fears underlying the arms race. Whether negotiated in conjunction with or subsequently tied to arms control agreements, such provisions would allow more substantial controls while satisfying traditional verification requirements.

PURPOSES OF VERIFICATION

The objectives of verification are to detect and deter violations of an agreement and to provide national and international confidence that signatories to a treaty are complying with its provisions. Deterring violations and building confidence depend on detection ability. As one side's ability to detect violations improves, the other side's risk in noncompliance increases; confidence that treaty obligations are being fulfilled rises accordingly.

Verification goes beyond normal military intelligence functions. It requires a determination of whether violations have occurred—a determination based on the collection and evalu-

ation of data (monitoring), but also requiring judgment and decision at the political level, because evidence can usually be interpreted in different ways. Nevertheless, the better the monitoring process, the easier it should be to decide on violations or, conversely, to assure treaty compliance.

The ideal for monitoring is free access, much like that enjoyed by a military inspector general, to examine any suspicious activity. In an adversarial situation, such access is unrealistic. Still, any movement in that direction will serve the objectives of verification.

Verification of treaty compliance is necessary for reasonable relations between countries. But it alone cannot ensure a stable strategic balance or reduce fears of aggressive behavior. Military activities not controlled by treaty must remain the target of traditional intelligence activities—especially since controls in one area can release resources to be applied to uncontrolled activities.

Traditional military intelligence is easier than verification. It entails watching activities where they normally take place—known test sites or ship construction yards, for example. Verification of the absence of banned activities, however, requires evidence that they are not occurring anywhere—even though extraordinary concealment measures will most likely accompany deliberate violations. Traditional intelligence seeks general characteristics and force levels. Verification can require exact measurement of capabilities or exact counts because "small" violations, if intentional, are politically important. Furthermore, evidence gathered not only should be usable in private consultations with the Soviets concerning potential violations,[1] but also should be publicly releasable to be useful in reacting to unresolved violations.

On the other hand, monitoring and verification can be simplified through such appropriate treaty provisions as noninterference with NTM (or by avoiding provisions that are hard to verify). In fact, because monitoring for verification purposes and traditional intelligence functions overlap, improvements in one area generally help in the other—and both help

in the accurate assessment of capabilities and intentions so necessary in reducing fears underlying the arms race.[2]

Hence, improved verification in general and on-site inspection in particular should be viewed as more than corollaries to arms control agreements. They also deserve attention as confidence building measures (CBMs) between nations, negotiated for their own sake rather than only as part of an arms control agreement. On-site inspection provisions as CBMs—in the spirit of those negotiated at the Conference on Security and Cooperation in Europe—would provide these benefits:

- Improved knowledge of activities not controlled by agreement and reduced fear of those activities undermining the stability sought in negotiated arms control agreements. Or, where effort is rechanneled, improved monitoring would increase warning time to allow an appropriate reaction without undue haste or overreaction. In either case, unwarranted fears and the momentum of the arms race would be reduced.
- Fewer problems arising from simultaneous negotiation of arms control measures and verification provisions. People who have invested a large effort in reaching agreement may not have the patience to accept legitimate challenges concerning inadequate verification. Treaty opponents, on the other hand, may seize on verification problems to hamper both negotiation and ratification. CBMs would ease verification problems and thereby reduce objections to arms control agreements from the American people, both in and out of government.
- An "enabling mechanism," opening the door to agreements not yet foreseen or pursued because of an inability to verify them. For example, mobile ICBMs are considered "good" on doctrinal grounds because they are reasonably invulnerable and therefore offer crisis stability, but the United States wants the Soviet SS–16 banned for verification reasons. Similarly, the United

States designed the Multiple Protective Shelter (MPS) system for MX with elaborate and expensive provisions for verification by NTM, without ever exploring straightforward and relatively inexpensive on-site inspection methods. On a more historical note, verification problems were partly responsible for delaying the SALT I agreement, until the development of reconnaissance satellites allowed verification by NTM.

The interaction between verification and intelligence goes beyond monitoring. Intelligence information may indicate or even confirm a violation, but still, the information will not fully satisfy verification needs if it isn't releasable in a convincing form or can't be used without revealing sensitive collection methods. Suppose a sensor spots a suspicious activity. If a violation is subsequently confirmed by an agent or another source that can't be revealed, action may still be restricted to asking for an explanation. But a much stronger response would be supportable if an approved monitoring method, such as on-site inspection, could be used for confirmation. The Cuban missile crisis demonstrated the importance of having both convincing and releasable information. Actual photographs of missile site preparation played the key role in convincing the American people and the United Nations that the Soviet threat was real. Without photographs, US government agencies might have been unable to reach a consensus on Soviet intentions, to say nothing of developing the strong response made by President Kennedy.

Negotiated inspection provisions would therefore serve to investigate suspicious activities, to confirm data from other intelligence sources, and to provide the convincing, releasable information necessary for consultations or appropriate responses to violations. If an activity in question violated an arms control agreement, then treaty monitoring purposes also would be served, with the problem of verifying desired agreements reduced accordingly.

LEVELS OF VERIFICATION

Agreements can include provisions for any level of verification, ranging from none to total. Verification may not be required in cases where—

- The violator would not gain an advantage, such as in the agreement "to notify each other immediately in the event of an accidental, unauthorized or other unexplained incident involving a possible detonation of a nuclear weapon which could create a risk or outbreak of nuclear war."[3]
- The violations would be reasonably obvious, such as in the atmospheric test ban from the Limited Test Ban Treaty.
- Signing an international agreement doesn't necessarily mean accepting a new restriction. For example, the United States agreed to ban biological weapons after unilaterally renouncing them.

The opposite extreme would be total verification. Absolute compliance with an agreement can never be guaranteed, although the Antarctic Treaty approaches the ideal with provisions (periodically exercised without incident) for exchange of information and "complete freedom of access at any time to any and all areas of Antarctica." In view of the limited activity and facilities in Antarctica, the opportunity to conceal a meaningful violation is practically nil.

Unfortunately, such a high level of verification can't be expected in most arms control agreements, and to insist on it might preclude the very agreements we seek. So the US standard has been *adequate* verification, "whether or not we could identify attempted evasion, if it occurs on a scale large enough to pose a significant military risk, in time to make an appropriate response."[4]

Judging adequacy is not a straightforward task. It involves assessing the other party's intentions. Is he honorable? Will he abide by the treaty but stretch the rules? Will he covertly violate the treaty if he thinks he can get away with it? Or would he actually violate the treaty openly to gain a significant advantage?

It involves assessing his opportunities and risks. Would violations be obvious, or could they be hidden easily? Would he be better advised to expend resources in areas not controlled by treaty? How can we respond to his actions?

Judging adequacy also involves assessing timing. How long would it take to make a significant change? When would the first signs be evident? Considering decision, research, development, production, and deployment lead times, how long would the United States need to respond?

Furthermore, judging adequacy involves assessing the possible advantages to be gained by the other party. Could he alter the strategic balance? Would he be more adventuresome? Could he use extra forces for coercion or for warfighting?

It's no wonder that reasonable men disagree on the adequacy of verification. The standard can be low whenever we trust the other party, whenever he has little opportunity to cheat without risking a serious response, and whenever the possible advantages to be gained from cheating are small. But if these conditions change, the standard of adequate verification must also change.

The United States, after much debate and some acrimony, accepted SALT I verification as adequate and ratified the treaty. The Carter administration judged SALT II adequately verifiable, but because the Senate never voted to ratify SALT II, the country as a whole never decided the question. If anything, US trust of the Soviets has declined since SALT I, and developments such as MIRVs and cruise missiles have increased cheating opportunities.

Yesterday's standards of adequacy may not be valid today. They may, in fact, be even less valid in the future, especially if overall strategic levels are reduced so much that cheating would provide greater advantages. Despite Soviet arguments to the contrary, judging a treaty's verification provisions adequate today does not assure their adequacy tomorrow. A judgment of adequacy should instead be viewed as just one step down the path toward more meaningful arms control.

HEIGHTENED IMPORTANCE AT REDUCED LEVELS

In 1972, in the Basic Principles of Relations Between the Soviet Socialist Republics and the United States of America, the two countries agreed, "The U.S.S.R. and the U.S.A. regard as the ultimate objective of their efforts the achievement of general and complete disarmament and the establishment of an effective system of international security in accordance with the purposes and principles of the United Nations." Complete disarmament is a worthwhile, though perhaps utopian, goal. It's just not realistic to think of either country giving up its major source of power unless the international situation changes drastically. But mutual reductions, even substantial ones, are possible because current and projected inventories of nuclear weapons are large enough to sustain such cuts without endangering either country's status as one of only two superpowers. So long as the United States and the Soviet Union can safeguard their vital interests, they have much room to maneuver.

Reductions to levels approaching general and complete disarmament (GCD) would require multinational agreements and much better verification procedures than exist today. Given today's inventories, several hundred extra nuclear warheads wouldn't seriously change the strategic balance.[5] Cheating on a scale to make a substantial difference would be hard to conceal, so motivation to cheat is low. With smaller inventories, however, a few hundred warheads would be much more important; at levels anywhere near GCD, they would provide clear strategic superiority. Motivation to cheat and

fear that the other side was already cheating would both be strong—clearly motivating a new arms race—unless verification procedures adequately guaranteed treaty compliance.

Negotiating toward a goal such as GCD is admirable but of little value beyond propaganda without complementary work toward improved verification, especially as the consequences of cheating increase. A world in which nations don't rely on military strength is hard to imagine. However, if the standard of the Antarctic Treaty—"complete freedom of access at any time to any and all areas"—could be applied to sovereign territory, why couldn't negotiations produce a world with far fewer weapons? The question is unrealistic, but it at least considers means as well as ends and recognizes that better arms control demands better verification.

PREREQUISITE TO ARMS CONTROL

Arms control is a process, not an event. Progress is periodically documented or ratified in a treaty, but problems always remain as technology and weapon systems advance. Work to build better agreements must proceed, based on experience gained. To date, strategic arms control agreements have helped channel activity, but they have failed to reduce arms or related expenditures. Continuing the extensive effort to control arms is hardly justified if better agreements cannot be anticipated.

The need for progress is well recognized. In fact, SALT II contained a joint statement of principles for further negotiations, including "reduction in numbers," "further qualitative limitation," and "cooperative measures" to enhance verification by national technical means. But past Soviet behavior and the high stakes involved limit progress to treaty provisions on which the United States can impose a high verification standard. Nor is the problem strictly limited to US-Soviet relations. Over 125 countries have agreed to the Treaty on the Non-Proliferation of Nuclear Weapons. Article VI of the treaty states, "Each of the Parties to the Treaty undertakes to pur-

sue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective control." Many non-nuclear countries feel that the United States and the Soviet Union have failed to live up to this commitment, and some have cautioned that lack of progress on disarmament could undermine restraints on proliferation.

Without better verification, arms control will not progress and may eventually unravel. As pointed out by former Secretary of State Haig, "Failure of the entire arms control process in the long run can be avoided only if compliance issues are clearly resolved."[6]

NEW DIMENSIONS

Arms control agreements are shaped by our verification ability. Using national technical means, we can adequately confirm many things: numbers of silos, submarines, and strategic bombers; conduct of ballistic missile tests; and even presence or absence of mobile ICBMs. Also, we can often infer MIRV capabilities, payload, accuracy, hardness, and range. But our capabilities are lacking or, at best, marginal in other areas: monitoring research, development, production, storage, and disposition of weapon systems; differentiating between nuclear and non-nuclear missiles; and verifying cruise missile range or Backfire range (especially with aerial refueling).

Better verification procedures will allow treaty measures that would be otherwise unattainable. While recognizing that there are many ways to improve verification, especially with reasonable cooperation, on-site inspection in particular would open up new arms control dimensions for consideration. MIRVs and very high-yield weapons might be banned. Chemical and biological weapon limitations could be better verified. Qualitative improvements could be better controlled. Bans on mobile but survivable ICBMs could be lifted. More nuclear-free or even weapon-free zones would be possible. The number of weapons on alert could be limited to preclude surprise attacks.

With sufficient on-site inspection, all phases of a weapon system's life cycle—from research through final disposition—could be controlled. Fears of technological surprise would be reduced. We could count warheads directly and answer questions about the disposition of old weapons, excess production, or missiles for reloading silos. And we could reduce our reliance on observation of tests by NTM to verify capabilities.

In short, on-site inspection could eliminate many of the verification barriers to stable and substantive arms control measures. These barriers won't fall at once, because acceptance of on-site inspection will be resisted, especially by the Soviets. But the potential benefits justify long, hard effort if that is what it takes to make progress in the face of Soviet resistance. Even grudging movement, if continued long enough, will substantially change the world of future generations.

3
ON-SITE INSPECTION

In the case of provisions that cannot be monitored by NTM, it will be essential to develop and reach agreement on cooperative verification measures ... that can help provide the necessary confidence in compliance.

Arms Control and Disarmament Agency
1981 Annual Report

ON-SITE INSPECTION

The quality of verification depends, in the final analysis, on the extent to which countries are willing to reveal information they consider sensitive. We have progressed on disclosure of information, but many desirable arms control measures may be unreachable without on-site inspection—complementing other verification methods where possible, but standing alone if necessary. However, in most circumstances, on-site inspection will reveal unprecedented levels of information and will allow access to what have been restricted areas. Both the Soviet Union and the United States, to differing extents, will resist this movement away from secrecy. Thus, greater openness will require counterbalancing benefits.

SECRECY-OPENNESS CONTINUUM

Relations between countries can range from complete secrecy, each country knowing nothing about the other's forces and activities, to complete openness, with free access and unhampered information flow. Arms control agreements and associated verification methods are fostered as relations move toward the openness end of the continuum. Thus, we need to view on-site inspection as a potentially valuable tool, to be used with other cooperative measures and other verification methods. As such, on-site inspection deserves renewed emphasis by the United States.

On-site inspection also deserves consideration because, if negotiable, it would be the most reasonable way to verify many arms control measures. The following examples are in order of increasing intrusiveness:

- In SALT II, the United States and the Soviet Union agreed not to supply ICBM launchers with more than one missile each and not to provide storage facilities for, or store extra missiles at, launch sites. This provision could be verified by banning suitably sized facilities within an agreed "rapid reload" distance of launch sites, or by requiring all such facilities to have openable roofs so that inside activities could be periodically observed by NTM. Alternatively, on-site inspection could verify the absence of missiles and missile storage facilities.
- SALT II bans the production, testing, and deployment of the Soviets' mobile SS–16 missile. It does not ban the SS–20, which is similar except that it has two stages, rather than three, and therefore lacks intercontinental range. However, differentiation between the two by NTM is very difficult. Furthermore, deployment of the SS–20 with only two warheads instead of the current three, or deployment with smaller warheads, would give it the ability to attack targets in the United States. On-site inspection could improve confidence that the SS–16 ban is being followed and permit a verifiable ban against configuring the SS–20 for intercontinental range.
- Production and stockpiling of biological and chemical weapons can't be verified by NTM. Large, obvious facilities are not needed, and the development processes involved are similar to commercial research and industrial processes. On-site inspection could help assure compliance with the existing biological weapons ban and lead to verifiable constraints on chemical weapons.
- Counting missiles is better than counting launchers, and counting warheads is better yet. Counting launchers is incongruous, as underscored by the fact that SALT II, if

ratified, would require the Soviets to dismantle 250 launchers but permit them to keep the associated missiles and warheads. On-site inspection would allow counting of warheads on missiles and checking of "unauthorized" sites and facilities to preclude illegal missile deployments.

As noted above, these examples are arranged in order of increasing intrusiveness. The first involves verifying the absence of missiles in facilities near launch sites, but not inspecting actual weapons. The second could involve inspecting missiles, but only at SS–20 sites. The third would require access to a wide range of production facilities. And the fourth could require access to all strategic weapons and all facilities large enough to store strategic weapons.[1]

In the third and fourth examples, actual inspection of all appropriate weapons and facilities would be excessively costly and time consuming. But it is the opportunity to inspect that is crucial. If any leak, small mistake, or suspicious activity could lead immediately to an inspection, with international reaction and publicity, cheating would be more risky. Greater risk in cheating would certainly raise confidence in compliance.

Verification by on-site inspection could also be inexpensive compared to verification by NTM—not only for the country seeking to verify compliance, but also, in some cases, for the country deploying a system subject to verification. For example, when the United States planned to deploy MX in multiple protective shelters, the plan included production and deployment provisions to facilitate observation by NTM: ports to be opened on the top of each shelter so contents could be viewed by satellite, entrance barriers to slow movement, storage rules, and limited access to the deployment area. In all, several billion dollars would have been spent just to set standards for verification by NTM in case the Soviets deployed a similar system. (The Soviets could count MX missiles accurately from open literature and congressional hearings.) Suitable on-site inspection provisions would have saved several

billion dollars, set a higher standard for verification, and provided a precedent to move toward more openness in arms control.

RANGE OF POSSIBILITIES

Acceptance of on-site inspection doesn't imply opening one's borders to let hordes of foreigners snoop and pry into anything whenever they want. On the other hand, it does imply accepting some level of intrusiveness and conceding to a foreign power information that it might not have otherwise. Intrusiveness must be balanced with reciprocal gains and improved arms control agreements, recognizing that on-site inspection procedures can be developed from a wide range of possibilities.

- Provisions could apply to different stages of a weapon system's life cycle: research, development, testing, production, deployment, storage, or disposition. Effective bans at one stage would eliminate the need for controls at later stages, and controls at multiple stages would raise confidence in counts or even eliminate the need for controls at intermediate stages. For example, effective controls on production and disposition of weapons would eliminate the need for deployment and storage controls—the big worries today—because knowledge of weapons produced and weapons destroyed would provide an accurate count of existing weapons by simple subtraction.
- Currently, the United States verifies quantitative limits on deployment by reconnaissance satellites and qualitative limits by using NTM to observe tests. Verifiable controls on additional activities would improve assessments of forces, and better information on research and development might constrain potential future weapon systems before resources for deployment are committed. The history of arms control shows that it's almost

impossible to "put the genie back in the bottle" once it is released.

- Inspection could be carried out by the parties signing an agreement—jointly or unilaterally—by third parties, or by representatives of international bodies. To minimize problems associated with publicity and national pride, inspection activities and results could be kept confidential, contingent on resolution of problems or violations.
- Inspection could make use of mechanical monitors or overflight by aircraft. Inspectors could be stationed at fixed locations or limited to specific areas. Agreements could limit their actions or grant them wide latitude. Inspections could be unscheduled or periodic, or limited to a set number of inspections per year with times and places decided by the inspecting party.

The above examples are illustrative but not exhaustive. They show that on-site inspection could be employed in a wide variety of circumstances, that reciprocal gains are possible, and that rejection of a specific method doesn't necessarily imply rejection of inspection in general. The best inspection method will depend on the situation, and a combination of methods will often be preferred. For example, mechanical monitors can be calibrated accurately, can sense things people can't, and can work continuously—with only intermittent checks by inspection parties to insure that nobody is tampering with the mechanical monitors.

US ATTITUDE TOWARD ON-SITE INSPECTION

With the development of reconnaissance satellites, verification by national technical means became the standard for SALT I and the Antiballistic Missile (ABM) Treaty. Each party agreed not to use deliberate concealment measures to impede verification by NTM. Similar provisions were incorporated into the Threshold Test Ban Treaty (TTBT) and SALT II. Even though the TTBT and SALT II have not been ratified, the

precedent for relying on NTM to verify compliance with strategic arms agreements has been established.

The Joint Statement of Principles in the SALT II agreement modified the precedent somewhat; it called for additional, but unspecified, "cooperative measures contributing to the effectiveness of verification by national technical means." In spite of this call, the United States has shown little interest in on-site inspection, not because of objections to inspection per se, but because national technical means satisfied the existing requirements without negotiation problems. Although treaties had to be carefully structured to be verifiable by NTM, at least they weren't delayed or precluded by verification requirements. Therefore, most Americans have learned to dismiss on-site inspection out-of-hand. They do not assess its pros and cons or object to inspections on US territory, but they have a preconceived notion that the Soviets won't accept it. The American character seems to include a tendency to look for quick solutions and then move on to the next problem—never checking back to see if the problem was really solved or if a better solution existed. When verification by national technical means was accepted instead of on-site inspection, the latter was popularly labeled "a bad idea," not worth further pursuit.

Over the last few years, the US government has been mounting a campaign for more cooperative verification methods, and on-site inspection certainly qualifies. Indeed, the US arms control community has shown renewed interest, although popular opinion in America has not yet followed this shift. The instinctive view that the United States, with its already open society, should benefit relatively more than the Soviet Union from increased openness may not hold in all circumstances. The United States must take special care to preclude loose enforcement provisions or loopholes that the Soviets might use to their advantage.

SOVIET ATTITUDE TOWARD ON-SITE INSPECTION

Although the Soviets have modified their position somewhat over time, they have historically resisted on-site inspection, claiming that it was just a cover for espionage. In fact, they have opposed verification controls in general. Their opposition is understandable in view of their ability to monitor US military activities through open sources.

Soviet resistance to inspection should not be viewed as rhetoric or merely an attempt to gain US concessions (although, in part, it may be just that). Based on their Russian culture and background, the Soviets' attitude probably reflects a true fear of espionage. They view the world around them as hostile—with reasonable justification. Historically, they have been obsessed with secrecy, especially in military matters.

Although *Russian* xenophobia is historic, a more important *Soviet* characteristic—the need to maintain internal control—has reinforced it. The relatively small group in control of the government has sought to maintain an air of crisis and encirclement to justify deprivation of consumer goods and civil liberties. The fear of invasion has motivated the Soviet leaders much less than the more realistic fear that their control in Eastern Europe and at home could unravel. The government has controlled the distribution of information and minimized contact between its own people and the outside world. The Soviets would view intrusive actions related to verification as matters of security. Those actions would be under the jurisdiction of the Defense Ministry and the KGB and would not be as subject to diplomatic or political pressure as in the United States.

Accordingly, Soviet opposition to on-site inspection has been greatest when it involved military matters or foreigners on Soviet soil. The Soviets have agreed to inspection concerning nonmilitary matters on non-Soviet soil. The most obvious example is the Antarctic Treaty. But they have also agreed to inspection of facilities on the seabed and inspection

of all stations, installations, equipment, and space vehicles on the moon and other celestial bodies.

In spite of Soviet resistance, there has been some progress. The Conference on Security and Cooperation in Europe (CSCE) has negotiated confidence building measures (CBMs), including a provision to invite "voluntarily and on a bilateral basis ... observers" to military maneuvers. Inspection by invitation as a CBM is a big step away from the inspection on demand that will probably be needed to prove arms control compliance, but exchanges of observers have, nevertheless, taken place.

The history of arms control also shows increasing Soviet willingness to allow collection of information on its military forces. In the early 1960s, the Soviets insisted that no verification was required. In SALT I they accepted verification by national technical means. SALT II added MIRV counting rules, data exchanges, and advance notification of tests. Finally, additional but unspecified cooperative measures became a principle for negotiations after SALT II. Certainly, relations could be much more open, but progress has been made.

Soviet resistance to on-site inspections on Soviet soil has hindered negotiation of some arms control agreements—notably a comprehensive test ban and a chemical weapons ban. But inroads have been made in this area too. For example, the Soviets have professed a willingness to allow on-site inspection of weapons dismantling. More importantly, the Soviet Union actually concluded an agreement, in the Peaceful Nuclear Explosions Treaty (PNET), for on-site inspection by US representatives on Soviet territory, albeit not weapons inspection. Although the treaty has not been ratified by the US Senate, it sets an important precedent. President Ford underscored this change in the Soviets' attitude when he signed the treaty on 28 April 1976: "The treaty ... is an historic milestone in the history of arms control agreements: For the first time it provides for extensive cooperative arrangements for on-site observation.... This accomplishment ... demonstrates that our

two countries can soberly negotiate responsible and beneficial agreements despite the difficulty of the challenge."

PROSPECTS FOR ON-SITE INSPECTION

Although any acceptance of intrusive arms control measures is encouraging, it doesn't necessarily indicate a basic change in Soviet policy. The Soviets will continue to resist greater openness. The United States will have to take the lead in promoting more open relations, realizing that progress will be gained grudgingly and that the Soviets will seek concessions in return. The Soviets would be giving up a unilateral advantage by agreeing to any sort of on-site inspection; they already enjoy the benefits of an open US society. On the other hand, the United States wouldn't accept all types of on-site inspection, even if they are reciprocal. For example, inspections that would help the Soviets advance technologically without offering a counterbalancing benefit to the United States would not be in the US interest. The United States could also face problems in getting US companies to accept inspections—especially if proprietary information might be compromised. When we blame inspection difficulties on the Soviets, we can easily concentrate on Soviet resistance and overlook US rights, sensitivities, and security needs. On-site inspection would infringe on the sovereignty of the United States as well as the Soviet Union. In the United States, it could also infringe on personal rights.

To further complicate matters, provisions for on-site inspection, in contrast to procedures for verification by national technical means, are very difficult to negotiate. National technical means are set up and controlled unilaterally. On-site inspection requires reciprocal measures and joint operations. The negotiators must iron out a myriad of details on issues such as frequency and duration of inspections, entry and exit points, transportation routes, allowable equipment, numbers and types of people involved, and even living accommodations. The issue of whether inspections will be on demand or by invitation must be addressed, and the Soviets will seek

concessions elsewhere for agreements that improve verification. The Soviets have historically shown a greater propensity than the United States for taking advantage of loopholes; therefore, the United States must take the time to iron out all the details properly.

To expect rapid implementation of on-site inspection provisions isn't reasonable. But the situation isn't hopeless either. As noted earlier, significant progress has been made, and the Soviets have moderated their position over time. In the early 1960s, the Soviets condemned satellites as tools of espionage and claimed that a state had the right to destroy satellite spies. However, when they started to benefit from their own satellite reconnaissance program, they softened their position. By 1967 the Soviets had, in effect, dropped their call for a formal ban on reconnaissance satellites by signing the Outer Space Treaty. (However, for propaganda purposes, they continued to speak against satellite espionage.) By 1972 they had completely reversed their position by signing SALT I, in effect agreeing not to interfere with national technical means.

Therefore, the United States should not reject on-site inspection simply because of Soviet resistance or implementation problems, nor because other ways exist to verify current or near-term arms control measures. It is worthwhile to set precedents for the time when large reductions, new technology, or new control measures will require better verification methods. Progress today will pave the way for further progress tomorrow, whereas continued reliance on NTM will make it harder to break away and negotiate new verification methods.

The Soviets have demanded parity and equal security,[2] but they have a decided advantage in obtaining knowledge of US forces and plans. They must yield that advantage to produce truly equal security and develop the mutual trust and confidence needed for substantial arms reductions.

Equal security demands equal verification, and equal verification demands that the Soviets forgo the excessive secrecy that has historically characterized their international relations.

Moreover, improved verification isn't solely a US advantage. The Soviets can't learn all they would like from open US sources and national technical means. Even if they could, they wouldn't be able to realize the potential benefits of arms control agreements without accepting mutual provisions to verify compliance. Nevertheless, the Soviets will not yield their cloak of secrecy easily. The United States will have to continue to push for better verification methods.

The United States tried and failed in the 1960s to get the Soviets to accept on-site inspection. Why should US efforts be more successful now? Many reasons might be advanced. For example, economic problems in the 1980s might motivate the Soviets to cut back on military expenditures and be more receptive to arms control measures; as the Soviet Union becomes more entwined in international relations, more internal and external contacts might be required; or the communications revolution might lead to a breakdown in the control of information in the Soviet Union.

The greatest *hope* for change, however, stems from the Soviets' new-found status as one of the world's two superpowers. With their accumulation of strategic and conventional strength, their fear of invasion has become less reasonable. They have, as a minimum, obtained rough parity with the United States. National pride and confidence should follow. They have improved their information sources, including the deployment of reconnaissance satellites. Their fear and suspicion of the outside world, and its use to maintain a crisis atmosphere, should therefore lessen—especially as the leadership and the general populace include fewer people with direct memories of World War II and the last invasion of the Soviet Union.

Now may well be the time to test the waters for another reason. The new leaders in the Kremlin may be more receptive to change than past ones, although they come from the same Soviet ideological mold. The next generation of leaders may be less influenced by World War II and the Stalin era and offer even more hope for progress. The process of changing

Soviet attitudes toward on-site inspection should, nevertheless, begin now, because it will take time to change cultural patterns and to gain increased access to Soviet territory.

RECOMMENDATIONS: GOAL, PATH, PACE

Reliance on national technical means for verification is a dead end. Verification by NTM simply can't handle the problems that must be solved to accommodate evolving technology and make substantial progress in arms control. SALT II principles agreeing to, but not defining, cooperative measures to enhance NTM were a step in the right direction. The Reagan administration's push for more openness and creativity in verification is another positive step. Indeed, on 6 January 1983 a Soviet disarmament proposal indicated a possible shift on verification. It offered a commitment to measures that include, "when necessary, international procedures," but the measures are not tied to NTM.[3]

Regardless of progress elsewhere, arms control problems can't all be solved without on-site inspection. The United States should promote such inspection, despite its problems, and use it as a focus to induce more open relations with the Soviet Union. Ultimately, both the United States and the Soviet Union will have to accept on-site inspection to break down the barriers to verification and mutually beneficial arms control.

A variety of verification tools will certainly continue to be used, but on-site inspection is a particularly promising one. Inspection provisions will prove hard to implement and will require substantial groundwork. But preparations can begin now, without waiting for a specific opportunity to employ on-site inspection. As inspection techniques evolve and gain acceptance by both the United States and the Soviet Union, there will be ample opportunity to implement them, and sufficient problems to justify their further development.

Therefore, the United States should make increased on-site inspection a national objective and pursue appropriate in-

spection methods whenever and wherever possible. The United States should persuade the Soviets to accept the fact that equal security requires equal verification. While both sides should strive to eliminate verification barriers to arms control progress, the United States will have to take the lead in promoting on-site inspection.

The path to increased inspection is not obvious, however. Measures to promote it will have to take into account disadvantages and potential adverse reactions. Could arms control opponents undermine beneficial measures by insisting on inspection where it isn't needed? Would efforts toward inspection detract from other efforts? What would the United States have to give up in return? What resources would be required? Can the United States reasonably expect to succeed? What would be the effect of complete resistance by the Soviets? How long would it take to make progress?

We cannot establish a goal without considering the path and pace to reach it, but an arduous path or slow pace does not lessen the goal's intrinsic value. I believe the potential benefits justify a substantial US effort to develop and negotiate on-site inspection provisions.

To that end, Chapter 4 outlines a strategy to promote on-site inspection. The strategy is designed to produce an environment conducive to inspection and to produce benefits to the United States even in the face of Soviet intransigence. I recommend it as a starting point for a more comprehensive US inspection strategy—to be developed and implemented under the auspices of the Arms Control and Disarmament Agency (ACDA).

Progress will depend on the determination as well as the resistance of both the United States and the Soviet Union, and it won't come quickly. To progress at a reasonable pace, the United States must be steadfast in its objective but allow the Soviet Union time to change.

Of course, any US efforts to promote on-site inspection shouldn't be considered as alternatives to other arms control

or defense efforts. We must build on the past. National technical means will remain fundamental to verification for the foreseeable future. On-site inspection initiatives should be developed to complement NTM as well as address problems NTM can't handle. Nor can we lose sight of the fact that arms control is only one ingredient in national security. The United States must also ensure that its military capability is sufficient to support national objectives and to motivate the Soviets to accept balanced reductions.

Progress promises to be slow, requiring detailed, time-consuming negotiations, with little immediate payoff in terms of reducing defense expenditures. But that is the history of arms control. The implications of an arms race and the dangers of war have justified the effort in the past and will continue to do so in the future.

4
STRATEGY TO PROMOTE ON-SITE INSPECTION

Our approach to verification will be to emphasize openness and creativity—rather than the secrecy and suspicion which have undermined confidence in arms control in the past.

President Ronald Reagan
18 November 1981

STRATEGY TO PROMOTE ON-SITE INSPECTION

On-site inspection provisions that the Soviet Union—or the United States—would reject are easy to design. The challenge is to develop mutually acceptable provisions that provide necessary verification data while minimizing intrusiveness. For example, if visual inspection of cruise missiles proves unacceptable, a variety of mechanical sensors could be used to differentiate between nuclear and conventional warheads; or if access to silos and missiles is not allowed because of security reasons, reentry vehicles might be counted on their deployment modules, separated from the missiles.

Detailed inspection methods for particular situations can't be specified in advance. Instead, they will have to be developed and negotiated on a case-by-case basis. This chapter discusses steps that will promote an environment conducive to on-site inspection rather than providing a cookbook of specific provisions. The recommended steps are in order of increasing intrusiveness:

- Actions by the United States to set precedents for on-site inspection and to put pressure on the Soviets.
- Negotiated provisions that are not directly intrusive but would help in developing on-site inspection arrange-

ments or would make it advantageous to allow on-site inspection even without reciprocity.

- Reciprocal negotiated provisions that would entail acceptance of some measure of intrusion.

US INITIATIVES

Because the Soviets are averse to it, on-site inspection will not be increased significantly unless the United States takes the lead in promoting it. The United States can undertake several initiatives that would bring on-site inspection to the forefront but don't require time-consuming negotiations or binding commitments.

State a US objective. Obviously, the US government must decide whether or not it wishes to seek actively more on-site inspection. If the decision is positive, the United States' first action should be to declare that it will seek to increase the use of on-site inspection to aid verification and arms control progress. Such a statement would be consistent with President Reagan's call for more openness and creativity in verification, and it would emphasize the need to go beyond the principles for future negotiations expressed in SALT II.

The US position should specify that verification procedures must be improved continually to handle evolving systems and technology and to permit more comprehensive arms control measures. Past agreement to rely on NTM must not be only a precedent. It must be also a starting point on which to build. The major barrier to on-site inspection should be seen for what it is—the Soviets' problem with increased contact with the outside world. It is a barrier that hinders arms control and fuels the arms race. A stated US objective to promote on-site inspection not only would represent a commitment to more open and creative verification procedures but also would emphasize that the onus for progress is on the Soviets.

Ratify TTBT and PNET. The Threshold Test Ban Treaty (TTBT) and the Peaceful Nuclear Explosions Treaty (PNET)

were submitted to the US Senate on 29 July 1976 for ratification. The administration should seek Senate ratification of both treaties.

The TTBT limits nuclear weapons tests to 150 kilotons, bans such tests outside designated sites, and calls for an exchange of data to aid verification by national technical means. The companion PNET allows nuclear explosions for peaceful purposes at other than designated test sites, provided that individual explosions don't exceed 150 kilotons.

The PNET also contains several important precedents for verification: relatively free access to sites before, during, and after nuclear explosions; use by the inspecting country of its own equipment in the country to be inspected; the promise of assistance and freedom from interference; and the establishment of a joint consultative committee to resolve verification problems and consider proposals for the joint development of standardized verification equipment. Those provisions are in addition to the use of NTM and are not designed as just a means of contributing to NTM effectiveness.

Ironically, formal action on the companion treaties has not been taken, apparently because of the inability to accurately verify by NTM the yield of weapons tests carried out under the TTBT. The irony is compounded by the fact that both the United States and the Soviet Union informally agreed to follow the TTBT 150-kiloton limit, but without the required exchange of data that would make NTM measurement of yields more accurate. As a result, the United States has been unable to confirm positively higher-yield Soviet tests, even though yields well in excess of 150 kilotons have been indicated several times.

The Russian saying, "The better is the enemy of the good enough," often holds true in the United States when we fail to act today because of the promise of something better tomorrow. (Witness the history of strategic bombers and the more recent proposals to skip the B–1B in favor of the Advanced Technology, or Stealth, Bomber.) The TTBT and PNET certainly appear "good enough" to deserve serious consideration

for ratification. The simple act of ratifying two treaties that were signed in the mid-1970s would accomplish the following:

- Provide a dramatic gesture to underscore the need for on-site inspection.
- Improve both sides' ability to monitor nuclear weapon tests.
- Establish a joint committee to improve on-site inspection methods and develop equipment for verification.
- Firmly establish precedents for on-site inspection.

One can argue that the precedents for inspection were already set when the treaties were signed and that they apply only to peaceful explosions rather than weapons or military forces. Nonetheless, ratification in the context of a US call for increased on-site inspection would be a positive action to add weight to the US position.

EDUCATING AND ACCLIMATING THE SOVIETS

Historically. the Soviets have been slow to accept new ideas, which is not surprising in light of their closed society and intolerance of questioning state policies. But they are not immune to change, especially if it is evolutionary rather than revolutionary. To foster a change in the Soviet Union, the United States must make sure the Soviets understand how they will benefit. They must have time to evolve and learn to appreciate the following points:

- The American people need assurance that treaties can be verified. The need is legitimate because of the imbalance in open sources of information, and unless the need is satisfied, the US Senate will not ratify arms control agreements.
- As verification improves, the US press, the public, and Congress will increase their support for arms control. Progress in arms control will become more likely, and

both the United States and the Soviet Union will benefit accordingly.

- As on-site inspection increases, contact between US and Soviet people will help build mutual trust. This will help slow the momentum of the arms race, which feeds on uncertainty and fear.
- Deterrence requires an understanding of a potential adversary's destructive capabilities. Both the United States and the Soviet Union seek deterrence. Having a potential adversary overly fear your military power because of poor understanding may be of some value, but it is merely short-term value. In the long term, the potential adversary will react to his excessive fears rather than to reality, and will build more defense countermeasures than he needs.[1]
- Finally, for some future systems and technologies, verification may prove impossible without on-site inspection; and without verification, there won't be control. The Soviets may take comfort in being able to monitor US actions through open sources, but they might have second thoughts on verification concessions if the United States proceeded to produce more advanced systems than the Soviet Union could. Cruise missiles are an area where the United States leads in technology and where negotiated control of deployments may prove unreachable due to verification problems.

Of course, to think these ideas aren't understood in Soviet arms control circles is naive. But the Soviets must overcome a culturally ingrained predilection for secrecy. The Soviets see the United States as their enemy. With their history of having been repeatedly invaded—most recently by Germany, with whom they had signed a nonagression pact—the Soviets base their international relations on their assessment of foreign capabilities, not on proclaimed peaceful intentions. The current US buildup of strategic forces, following the postwar policy of containment, fuels the Soviets' suspicions.

Education alone won't change such ingrained attitudes. Time and perseverance will be needed to bring the Soviets to accept a world of more and more on-site inspection. Therefore, a US strategy to promote on-site inspection shouldn't expect rapid acceptance of comprehensive inspection schemes. Instead it should be based on finding and implementing acceptable actions where possible, working with the Soviets to develop inspection techniques, and evolving comprehensive plans by building on past accomplishments.

Pressure the Soviets. The Soviets are isolated from many of the pressures that influence decisions in the United States, but they are neither completely immune to world opinion nor unconcerned with their reputation in the international community. The United States can bring a variety of pressures to bear on the Soviets through public channels such as the press, the United Nations, and other international bodies, and through private channels such as the US-Soviet Standing Consultative Commission (SCC) for SALT or direct personal contacts. The following tactics serve to illustrate how a campaign of pressuring the Soviets might be implemented.

At the most basic level, the United States should persist in emphasizing the value of on-site inspection and point out that it is the Soviets' penchant for excessive secrecy that blocks arms control progress. If the Soviets are serious, honest participants in arms control, then they should have no qualms about cooperating to improve confidence in compliance. In fact, excessive secrecy suggests a policy of noncompliance because it suggests that there is something to hide.

The Soviets should be discouraged from proposing blatantly unacceptable disarmament measures and thus portraying themselves as champions of peace. The United States should not simply reject such propaganda ploys and thus look uncooperative in arms control. Instead, it should respond in each instance with a proposal that moves in the desired direction but includes verification conditions for the Soviets to meet to prove they were serious in the first place.

For example, the nuclear freeze movement, which put the US government on the defensive, was exploited by the Soviets. The roles might have been different had the United States proposed an agreement to freeze production of nuclear warheads on the condition that deterrence could still be assured by allowing redeployment of existing warheads on more modern, stable weapons systems. Additionally, such an agreement could have been contingent on verification procedures—including inspection of production facilities and reliable counting of deployed and stored warheads—being negotiated and a timetable being set for negotiating warhead reductions. More than likely, the Soviets would have rejected such conditions. They would then have appeared to be the greater obstacle to a freeze, defusing pressure on the United States.

In other words, if Soviet behavior blocks movement toward a goal that is reasonable or worthy of serious consideration, the United States should emphasize conditions the Soviets must accept before movement is possible. Of course, any condition put forth for the Soviets to accept must also be acceptable to the United States on a reciprocal basis. So the United States must carefully plan and coordinate in advance if its responses to Soviet proposals are to be timely.

The United States would therefore have to invest effort in developing on-site inspection arrangements, coordinating them within the government, and deciding circumstances in which they could be used. With such plans in hand, the United States could move from rhetoric to more positive actions. Perhaps the easiest and most straightforward way to apply pressure for more open relations would be formally and publicly to provide the Soviets—preferably through multinational bodies—with information on current and planned US military forces and systems that is already public knowledge, and then request reciprocity. The Soviets already get extensive information from sources such as Department of Defense Annual Reports, military posture statements, DOD fact sheets on military forces and systems, open Congressional hearings, and the media.

At worst, pressure through public or multinational forums for reciprocal information would fail to induce the Soviets to release more information. But it would dramatize the difference between US and Soviet societies to the world at large and popularize US support for confidence building information exchanges. At best, the Soviets would provide additional official information which could then be used as a baseline for monitoring, verification, and on-site inspection.

The United States could also offer the Soviets on-site inspection of facilities and activities that are already open to the public or where only easily obtained information would be revealed. For example, the public is already invited to tour many military bases, research labs, and contractor facilities; equipment from all services is often displayed for public inspection, especially on Armed Forces Day; and space and missile test launches are routinely viewed by the public. So inviting the Soviets to make such inspections would be of little cost or damage. And if the inspections were offered to other countries as well, international pressure for the Soviets to reciprocate should increase.

The United States could increase the value to the Soviets of on-site inspections by including activities or facilities that are not easily accessible or that go beyond normal public relations. A good example would be to invite Soviet representatives to witness the dismantling of Titan II launchers. Undoubtedly, offering such inspections without insisting on a measure-for-measure quid pro quo would raise many objections in the United States, even though the United States could unilaterally set inspection conditions and thereby control information access. However, the decision to offer such inspections should rest not on the expectation of reciprocity, but rather on the value in setting precedents and putting pressure on the Soviets—keeping in mind that anything offered unilaterally can be withdrawn unilaterally.

Lastly, the United States could offer the Soviets on-site inspection on a reciprocal basis—either as a confidence building measure or as part of an arms control agreement. Such an

arrangement would require considerably more preliminary work since it would require mutually acceptable terms, entail the release of valuable information, and could not be easily withdrawn. On the other hand, it would make available valuable information for the United States in return, enhance verification, and strengthen the foundation for further cooperation.

Allowing Soviet access to US information that couldn't be obtained otherwise will cause strong objections in the United States. However, the information received in return may be even more valuable. For instance, agreements to exchange observers at exercises or weapon tests should be more valuable to the United States than to the Soviet Union because the Soviets already enjoy access to many other open sources of Western technical information. The United States would have to assure that reciprocal inspections at this level are balanced and meaningful—more than attendance at parades or other public demonstrations.

In sum, the United States can take a variety of actions to promote on-site inspection, ranging from educating the Soviets to mounting a pressure campaign against them. The effort wouldn't be worthless because even rejected proposals for reciprocal on-site inspection could have considerable propaganda value. But propaganda should be only a secondary objective. The primary goal should be to show how on-site inspection can be used to improve verification without impairing national security, thereby promoting arms control progress.

NEGOTIATED PROVISIONS THAT ARE NOT DIRECTLY INTRUSIVE

Several cooperative measures are possible that would help establish a framework for on-site inspection but wouldn't, in themselves, require intrusions into Soviet matters. This section discusses three such measures, each requiring prior agreement between the United States and the Soviet Union: increased responsibility for facilitating verification, negotiated principles for on-site inspection, and the establishment of a

joint US-Soviet committee to develop and promote better verification methods.

Responsibility for provisions to enable verification. The United States and the Soviet Union have agreed to the principle of verification by national technical means, with appropriate but unspecified cooperative measures contributing to NTM effectiveness. A stronger principle would be that a nation deploying strategic arms has the responsibility to provide for realistic verification of compliance with strategic arms agreements, perhaps tied to a requirement for notification of new systems. As an example, SALT II requires notification of the first launch and the twenty-fifth or last launch before deployment of a new light ICBM (article IV, para. 9). The two dates would provide a reasonable period for resolving any verification problems.

Historically, the United States assumed the de facto responsibility for accommodating Soviet verification—witness the extensive debate that took place on the verification of MX in the Multiple Protective Shelter (MPS) basing mode and the congressionally dictated need for arms control impact statements for new weapon systems. With the suggested provision for verification responsibility, both sides would have the same general obligation, but wouldn't necessarily have to satisfy the obligation in the same way.

The MX in multiple protective shelters is a good case in point. In spite of the potential for verification stemming from the open nature of US society, the MPS plan included provisions for high-fidelity verification depending only on national technical means, at a cost to the United States of several billion dollars. The cost was justified by the proposition that if the Soviets were to deploy an MPS-like system, they would have to meet the verification standards set by the United States. This proposition is somewhat dubious since the Soviets never agreed to any such conditions.[2] The justification would have been more logical if both countries had assumed a responsibility to facilitate verification. Provided that responsibility was not tied to NTM, the United States could have saved several

billion dollars by developing and offering a verification scheme for MX based on on-site inspection.

Negotiated principles for on-site inspection. In the same way that the Joint Statement of Principles in SALT II set a basis for further negotiation, appropriate joint principles would ease implementation of on-site inspection. For example, a commitment to minimize intrusiveness, or conditions to limit the release of information resulting from inspections, might well relieve fears and promote cooperation in developing mutually acceptable inspection techniques. Paragraph 8 of the Standing Consultative Committee (SCC) regulations sets a precedent for controlling distribution of information: "The proceedings of the Standing Consultative Committee shall be conducted in private. The Standing Consultative Committee may not make its proceedings public except with the express consent of both commissioners." The SCC has kept its proceedings secret, allowing the resolution of verification problems without the drawbacks of press coverage, public debate, and public posturing.

A principle of particularly far-reaching potential is that of "substitution," wherein the United States or the Soviet Union could allow suitable on-site inspection of their own forces as a substitute for providing currently accepted aids to verification by NTM. By allowing appropriate inspection, for example, the United States could avoid artificial rules for counting weapons, avoid having to put functionally related observable differences (FRODs)[3] on B–52s modified to carry cruise missiles, and avoid the de facto requirement to accommodate verification by national technical means as discussed in the MX example earlier. Interestingly, agreement to this principle wouldn't actually require either side to allow inspection on its soil, but advantages would accrue to the side permitting it. One side could continue to follow "standard" procedures while the other side used the "substitution" principle for its own benefit:

- Saving money would be the most direct benefit—by avoiding such things as functionally related observable differences or add-ons to facilitate verification that pro-

vide no increase in effectiveness and, as was the case with MPS for MX, may even reduce effectiveness.

- Controls on warheads rather than launchers and a verifiable method to count warheads accurately would be conducive to deployment of non-MIRVed, relatively stable forces. Current controls on launchers and rules for counting warheads encourage highly MIRVed systems, which are high-payoff targets. On-site inspection would allow verification of the actual number of warheads that launchers or missiles contain, so controls on launchers and missiles wouldn't be needed. With controls only on warheads, any side permitting inspection of its missiles would be strongly motivated to deploy its limited number of warheads on single-warhead carriers—because an attack on a non-MIRVed force would always destroy fewer warheads than the attack would use up. Non-MIRVed forces can also be used more efficiently than MIRVed forces and still effectively threaten MIRVed forces. Thus, assuming appropriate but not unreasonable conditions, the side permitting inspection of its missiles through use of the "substitution" principle would have a more effective and survivable force that would discourage attacks against it.[4]

- Even without redeploying limited warheads on single-weapon missiles, an accurate count of existing warheads on ICBMs or SLBMs could permit deployment of additional forces. Use of current counting rules for limiting warheads depends on the assumption that all missiles are deployed with the maximum allowable number of warheads. However, this assumption results in an over-count because, for a variety of reasons, many missiles have fewer warheads than allowed. On-site inspection of missiles without the maximum number of warheads could confirm that the warhead limit wasn't reached and allow deployment of more missiles. Permitting on-site inspection could, therefore, enable a country to increase its overall power within a warhead limit.

With verifiable controls on warheads, stability would be promoted by keeping the maximum percentage of warheads loaded on alert forces, thereby minimizing vulnerability to attack. Today the majority of US bomber and submarine warheads are not on alert; the Soviets could change the strategic balance substantially by a surprise attack to keep the United States from generating its strategic forces (going to high readiness or high at-sea rates). Off-alert warheads are therefore valuable targets. They can be destroyed with few attacking warheads, and unfortunately, they are often close to population centers, making escalation to countervalue attacks probable. However, if the percentage of off-alert warheads were low, an attacker would have little to gain in a surprise attack; he could not confidently plan to destroy all of the large percentage of warheads on alert. In the extreme case, were all warheads loaded on alert forces, an attacker would use a portion of his strategic warheads and might destroy no warheads in return. The surprise attack would change the balance in favor of the side attacked! With controls only on warheads, it would therefore be advisable to reload warheads from forces coming off alert to those going on alert. This action would eliminate much of the motivation for a surprise attack while maximizing the utility and deterrent value of a limited number of warheads. Naturally, the current ratio would have to change, with either more bombers and submarines or fewer warheads. If the hoped-for reduction in warheads is not forthcoming, the "substitution" principle would permit a side to deploy additional forces if its off-alert warheads were accurately and verifiably counted. In either case, the motivation for a first strike would be lowered.

The key to most of the above force deployment improvements is not on-site inspection per se. Rather, the key is a method to verify a warhead limit. But current verification methods fall far short of those required to accurately control warheads, and on-site inspection could be the method needed.

In sum, on-site inspection in conjunction with the "substitution" principle wouldn't force either side to accept on-site in-

spection. The Soviets would not be denied their excessive secrecy. But if they wanted to comply with SALT agreements or current START proposals without sacrificing secrecy, they would have to forgo an opportunity to save money, increase their power, and deploy their missiles in a more stable manner.

Joint US-Soviet committee. Development of mutually binding provisions, or even principles, for on-site inspection will require a forum for discussion and negotiation. Two forums which already exist might be useful in such an endeavor:

- The SALT I agreement established the joint US-Soviet Standing Consultative Commission (SCC), which, along with other responsibilities, functions as a forum for addressing questions on compliance with strategic arms agreements. Furthermore, the Joint Statement of Principles in SALT II obligated the United States and the Soviet Union to "seek to strengthen verification and to perfect the operation of the Standing Consultative Commission in order to promote assurance of compliance with the obligations assumed by the Parties."
- The United Nations Institute for Disarmament Research works on verification of disarmament agreements. Although multinational in character, it could provide a useful forum for fostering expansion of on-site inspection through development and implementation of acceptable inspect · arrangements or, failing that, at least encourage the Soviet Union to work with the United States to improve verification.

However, both these organizations are oriented toward compliance with existing agreements rather than developing and implementing new ones. In addition, multinational forums are seldom useful in bilateral US-Soviet matters, except indirectly. A new joint organization may be most appropriate to promote improved verification techniques in general and on-site inspection in particular. Alternatively, the role of the SCC could be expanded to handle these functions, taking advantage of the SCC's well-established working relationship. The

SCC has apparently worked well to resolve questions of compliance with existing treaties. The next step is to develop new, mutually acceptable monitoring techniques, which are needed for substantial arms control progress.

NEGOTIATED PROVISIONS THAT REQUIRE INCREASED INTRUSIVENESS

Negotiated implementing provisions would, of course, be the end objective of a campaign to promote on-site inspection. At this time, the United States can't draw up a list of specific provisions to seek. That must await considerable groundwork and implementation of other preparatory actions already discussed. However, keeping in mind the long-term advantages in acclimating the Soviets to on-site inspection and building mutual trust, the United States should seek opportunities to expand inspection provisions incrementally and not hope to implement a major inspection arrangement all at once.

The ultimate benefit of on-site inspection won't be realized without access to military forces on Soviet territory. Although this must remain the long-term goal, initial progress may be more likely if inspection of military forces on Soviet territory can be avoided. (Witness the Peaceful Nuclear Explosions Treaty and confidence building measures in Europe.) The United States could seek agreement on inspection of military forces such as submarines, ships, or aircraft while they are outside the Soviet Union, or on inspection of nonmilitary activities in the Soviet Union to verify that they are not improperly engaged in controlled activities. Indeed, the United States should work to expand application of existing European confidence building measures (CBMs) deeper into Soviet territory and to negotiate US-Soviet agreement on inspection provisions, either as CBMs or as means to enhance verification of current arms control agreements.

Finally, the path to arms control progress could be opened as verification barriers are eliminated. With techniques in hand, accepted by both sides, to deal with previ-

ously intractable verification problems, the United States and the Soviet Union could concentrate their efforts on more comprehensive and effective arms control measures.

Such a goal may be too idealistic, and critics will no doubt label it unattainable in light of expected Soviet resistance. Indeed, if it were an all-or-nothing proposition, such a campaign would be much harder to justify. But the United States could gain considerable interim advantages even if the Soviets remain uncooperative.

- As a minimum, the United States would gain a propaganda advantage by offsetting Soviet propaganda ploys and substantiating to the world at large that Soviet secrecy is a major stumbling block to arms control progress.
- Even if the Soviets resist on-site inspection per se, the campaign could induce them to accept other less intrusive verification measures and to move toward more open relations.
- Under the proper conditions, US use of the "substitution" rule would be conducive to deployment of more survivable, stable US forces; would allow an increase in US power within weapon constraints; and would let the United States avoid expenditures to make its systems verifiable by national technical means.

Conversely, pursuit of advantage should not be the main objective of a US inspection strategy. Ultimately, both sides will be more secure when they accept each other's right to reasonable parity and stop striving for unilateral advantages. But such a state will depend on the development of mutual trust, based on confident knowledge of each other's capability and intent. On-site inspection promises to be a key to that development—a key that could open the door to a new era of arms control.

ENDNOTES

CHAPTER 1

1. While there are three traditional arms control objectives, reducing the risk of war is apparently the most important one, seemingly pursued at the expense of raising the consequences of war and spurring higher defense budgets. Deterrence has been used to justify higher force levels and modernization efforts, and both US and Soviet defense budgets are increasing. The Soviet defense budget has grown, after adjusting for inflation, at about 3 percent per year since 1959. According to the Joint Chiefs of Staff Military Posture Statement for FY 1983, the Soviet Union has outspent the United States on defense since 1972 and now allots 12 to 14 percent of its gross national product to its military budget. US defense spending has been rising since 1976, and continued growth is sought to narrow the gap between US and Soviet capabilities.

2. An example of the effects of "worst-case" analysis can be seen in the *United States Military Posture Statement for FY 1983,* prepared by the Organization of the Joint Chiefs of Staff, Washington, DC. It projects (in chart II–9) what would result if the Soviets launched a surprise attack and the United States retaliated after riding out the attack. Assuming that this first strike came without warning, the post-exchange position would, as expected, favor the Soviets. In spite of the fact that most defense experts consider a surprise attack improbable, the results are used to justify "sustained US modernization." If both sides seek equal post-exchange capability following a surprise first strike, it's obvious that neither side will be satisfied with parity.

3. The US commitment to arms control is also suspect: the United States signed SALT I while fully intending to continue deployment of MIRVs, and arguments in the media and Congress justified SALT II as acceptable because it would not require any changes to US force modernization plans.

4. The meaning of national technical means (NTM) has not been agreed to formally in negotiations. However, the Arms Control and Disarmament Agency (ACDA) (in *Verification: The Critical Element of Arms Control,* Washington, DC, 1976) called NTM "sophisticated methods of data collection which do not operate from installations in the territory of the parties being monitored." This definition is consistent with international practice. It implicitly places reliance on photo-reconnaissance satellites and a variety of sensors.

5. A cold-launched missile is expelled from its silo by gas expansion. The missile then ignites outside the silo, minimizing damage and facilitating reload. A hot-launched missile is ignited in its silo, damaging the silo and necessitating extensive refurbishment before reuse. Soviet SS-18 and SS-19 ICBMs are cold-launched. All US ICBMs are hot-launched, although MX, if deployed, will be cold-launched.

6. Additionally, the United States has agreed not to deploy Minuteman III with more than three warheads, although it has twice been tested with seven reentry vehicles. Testing is a key ingredient in verification because it is reasonably observable by NTM and both the United States and the Soviet Union test new systems before deployment.

7. Counting rules also encourage "worst-case" analysis through the assumption that missiles will have the maximum number of warheads allowed. This tends to increase the projected threat and lower estimates of surviving warheads after an attack. Therefore, it raises required force levels.

8. For a more complete discussion of President Reagan's proposal and its verification and force structure implications, see Mark M. Lowenthal, *The START Proposal: Verification Issues,* Congressional Research Service, Library of Congress, Washington, DC, 25 June 1982.

9. During the second session of SALT I negotiations (16 April to 14 August 1970), the United States proposed a ban on MIRVs with verification through on-site inspection, but the Soviets rejected the pro-

posal. The Soviets subsequently sought a MIRV ban, but not on-site inspection. When SALT I was signed in May 1972, deployment of MIRVed Minuteman III and Poseidon missiles was underway, and the United States no longer supported a MIRV ban.

10. MIRVed systems create targeting problems because all warheads on a missile must be used at the same time and against targets that are within the footprint of the missile (the pattern in which the multiple warheads land). Further constraints arise from the desire for "option purity," which means all a missile's targets must be in the same target class—for example, all military, all in the same country, all in the same limited or selective attack options, or all avoiding urban damage. The problem is especially difficult in the case of SLBMs with many warheads, a small footprint, and the possibility of revealing a submarine's location and making its remaining SLBMs vulnerable when a single SLBM is launched.

11. Deploying a set number of warheads on non-MIRVed missiles would increase survivability in several ways. It would facilitate mobility, making the missiles difficult to find and target. By creating more targets, it would force an enemy to spread his attack; so each missile would be the target of fewer weapons and would have a greater chance to survive. Most importantly, if both sides have the same number of warheads, the country launching the first strike, due to misses and less-than-perfect reliability, would have to expend more warheads in an attack than it could destroy, thereby assuring the other side more surviving warheads than the attacker retains.

CHAPTER 2

1. Article XIII of the ABM Treaty provided for the Standing Consultative Commission (SCC) to promote the objectives and implementation of the provisions of the ABM Treaty and, subsequently, the SALT I and II treaties. The SCC keeps its proceedings secret to facilitate consultations. Furthermore, the SCC has apparently worked well in resolving compliance problems. According to *Arms Control and Disarmament Agreements: Text and History of Negotiations,* 1982 edition, US Arms Control and Disarmament Agency, Washington, DC, p. 138, "In each case raised by the United States, the Soviet activity in question has either ceased or additional information has allayed U.S. concern."

2. Additional, authoritative material on the purposes of verification and the relation of verification to traditional intelligence functions is available in *Verification: The Critical Element in Arms Control,* ACDA

Publication 85, Washington, DC, March 1976. This pamphlet and many other US Arms Control and Disarmament Agency publications are available at no cost from the ACDA Bureau of Public Affairs.

3. From the "Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War Between the United States of America and the Union of Soviet Socialist Republics," signed and entered into force on 30 September 1971.

4. US Department of State, Bureau of Public Affairs, *Verification of SALT II Agreement,* Special Report No. 56, Washington, DC, August 1979.

5. The United States has over 9,000 nuclear warheads in its strategic arsenal and the Soviet Union has over 7,000. If tactical nuclear weapons were counted, the numbers would more than double. Therefore, adding several hundred weapons to either side would change the totals by less than 5 percent. Of course, looking only at totals ignores the qualitative difference between weapons. For example, the 1,000 warheads planned for deployment on MX are important because they would survive an attack and be available for retaliation. Their ability to enhance US first-strike capability is of lesser importance.

6. Alexander M. Haig, Jr., Policy Statement on Arms Control to the Foreign Policy Association, New York, 14 July 1981.

CHAPTER 3

1. Many people assert that the Soviets could not covertly deploy a strategically significant number of ICBMs. However, Amrom H. Katz (in *Verification and SALT: The State of the Art and the Art of the State,* Washington, DC, 1979) offers a reasonably convincing way for them to do just that. He suggests putting an SLBM-carrying submarine into any of hundreds of warehouses. The missiles would not require any external support, and since they would be on a pre-surveyed site rather than a moving submarine, their accuracy would be improved. The submarine itself could be discarded, leaving the missiles covertly deployed and ready to be launched. Of course, the submarine isn't needed, but the example is useful to convince people that such a deployment could be carried out, using current technology and without unusual construction activity or obvious communication equipment.

2. Both the Soviet Union and the United States have endorsed the objective of equal security. For example, on 29 May 1972, a joint US-

Soviet communique said, "The two sides intend to continue active negotiations for the limitation of strategic offensive arms and to conduct them in a spirit of good will, respect for each other's legitimate interests and observance of the principle of equal security." Similarly, the SALT II principles for further negotiation said, "The Parties will continue to pursue negotiations, in accordance with the principle of equality and equal security." However, the Soviets seem to refer to the principle more often than the United States, both to justify their own actions and to condemn US modernization efforts as attempts to circumvent the principle.

3. Reported in *The Washington Post,* 7 January 1983, p. 1.

CHAPTER 4

1. A prime example of reacting to fear and not reality was the nonexistent missile gap in the late 1950s and early 1960s. In the short term, Soviet leader Nikita Khrushchev sought to take advantage of US overestimates of Soviet forces. In the long term, the United States overreacted with a massive strategic buildup that put the Soviets in a position of inferiority for almost two decades and finally led to massive nuclear arsenals on both sides.

2. The question of verification for MX in MPS was actually more complicated than indicated in the text because MX opponents used potential verification to forestall MX development. As a result, MPS was designed for high-fidelity verification, felt by many people to far exceed normal "adequacy" standards. Nonetheless, the thrust of the MPS example remains valid.

3. The purpose of functionally related observable differences (FRODs) is to allow NTM to identify the mission of a specific aircraft when that type of aircraft performs several missions, not all of which are counted the same way in SALT. Thus, all B–52s equipped to carry cruise missiles will have FRODs, observable by NTM, to differentiate them from B-52s not equipped to carry cruise missiles. Similarly, the Soviets agreed to give FRODs to their 31 Myasishchev aircraft used as tankers to indicate that they can't perform the mission of heavy bombers.

4. The US proposal for START, calling for controls on warheads and missiles instead of launchers, was a move to change the unit of account for arms limits away from launchers, but it didn't go far enough. With a missile limit of under 1,400 and a warhead limit of 5,000, missiles would have an average of over 3.5 warheads each. A portion of

the warheads could be deployed on a non-MIRVed ICBM force, but then the SLBM force would be very highly MIRVed, worsening footprint and targeting problems and seriously imbalancing the Triad. A START agreement containing a limit on missiles would preclude a stable non-MIRVed ICBM force. It may seem ironic that proliferation of missiles could be desirable, but verifiable controls on only warheads would make this the case.

ABBREVIATIONS

ABM	antiballistic missile
CBM	confidence building measure
FROD	functionally related observable difference
GCD	general and complete disarmament
ICBM	intercontinental ballistic missile
MIRV	multiple independently targetable reentry vehicle
MPS	multiple protective shelters
NTM	national technical means
PNET	Peaceful Nuclear Explosions Treaty
SALT	Strategic Arms Limitation Talks
SLBM	sea-launched ballistic missile
START	Strategic Arms Reduction Talks
TTBT	Threshold Test Ban Treaty

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